1.0 TITLE OF EFFORT: Engineering and Technical Services Support

## 2.0 TASK DESCRIPTION:

The contractor shall provide engineering and technical services including technical integration support, meeting support, engineering services support, integrated test and verification support, cable and fluid assessment support, project management support, hardware delivery support, book coordination support and special study support.

## **2.1 STATEMENT OF WORK REFERENCE:** SOW 3.1.1.1 Engineering and Technical Services

WBS	Title	Sub Title	Functional Description
	Vehicle Management and Administration	Progress Reporting	Prepare monthly presentation of accomplishment, risks, and financial status. Provide monthly budget varience assessment and revise Estimate to Completion (ETC). Prepare award fee self assessments.
	Vehicle Management and Administration	Task Order management	Prepare and maintain task order statement of work and basis of estimate. Coordinate with employees and customers.
	Vehicle Management and Administration	Employee performance assessment, coaching, and mentoring	Conduct formal performance assessment of each employee annually and informal assessments as needed (due to job function changes or performace feedback).
	Vehicle Management and Administration	Travel coordination	Prepare travel extimates; obtain required coordination for trips; review/approve travel authorizations and expense reports
	Vehicle Management and Administration	Task coordination	Monitor customer needs and emplyee performance to ensure required work is performed in accordance with the statement of work and to the customer's satisfaction. Monitor employee work load and skill mix. Take corrective action as needed.
1.1.1	Meeting Support	Meeting Coordination	Schedule meeting conference rooms and reserve equipment. Schedule and set up meeting telecoms. Create and distribute weekly meeting agendas using Agenda Calendar Tool (ACT). Prepare meeting presentation packages. Develop meeting minutes & protocols.
1.1.1	Meeting Support	Action Tracking	Capture and distribute notices requesting action closure before due dates.  Track L&M team actions through closure.  Track action status through closure for all International Partner L&M Technical Interchange Meetings (TIMs), Bilateral & Multilateral meetings.
1.1.1	Meeting Support	Communication Coordination	Create and maintain meeting calendars.  Maintain meeting distribution lists.  Maintain rosters and phone list.

1.1.1	Meeting Support	MER technical services	To provide technical support (minutes) to the ISS MER Mgrs when anomalies arise on ISS that require
.1.1.1	Mosting Cuppert	MEDALLICA	resolution.
[. +. f. ]	Meeting Support	MER technical services	Upload MER ART/FIT/coordination meeting notifications
1.1.1	Meeting Support	MER technical	Provide technical support (minutes) daily at the MER
		services	Tagups Tagups
.1.1.1	Meeting Support	MER technical services	Provide technical support for the MER Mgrs tagups during US flights (other 2 shifts)
.1.1.1	Meeting Support	Node 2/3 Status and Issues Teleconference Coordination	Prepare and distribute agenda for Node 2/3 Teleconference. Write minutes, coordinate and respond to input. Make sure minutes are posted to Nodes website. This activity also takes place for other Nodes meetings.
.1.1.1	Meeting Support	Test & Verification	Pre-Board Prep, e-mail notifications, posting documents, preparing agenda, Pre-board meeting, Board meeting notification Update Agenda for Board, load updated documents on the web, make copies for the board, prepare minutes
.1.1.2	CoFR Process Support	CoFR	Produce flight specific production plan, Organize several meetings w/OB, EA,Boeing and CMC. Distribute Meeting notice update agendas, compile data from system/teams format data in to presentations, repro copies to support LPA/kickoffs, track and status open paper including CRs, waiver/Deviations and Exception/CoFR Exceptions and open actions. Generate flt specific Boeing/CMC H/W matrix that's included in OB CoFR Plan/letter. Assist CoFR Lead update CoFR Plan and ditribute to ISS
.1.1.2	CoFR Process Support	CoFR	Review manifest to build and populate the GFE hardware matrix and down manifest charts for each SORR and COFR. Coordinate schedule meeting with GFE hardware providers for status on GFE hardware. Utilize and track open paper via the OPMT. Track open paper and provide status to the EMCR. Coordinate the status of hardware issues with the subsystem teams. Support CoFR Meetings and SORRs as required.
.1.1.2	CoFR Process Support	CoFR and Open Paper Process Improvement	Coordinate with different NASA organizations to identify, capture, incorporate all of the open paper for flights and coordinate tools/build tools for incorporating all of the open paper for the IP Element Flights in preparation for CoFR.
1.1.3	Program Review Support	Element Integration for ATV	Maintain matrix showing requirements ownership.  Develop and maintain VCM. Distribute closure documents and track comments. Organize issue resolution meeting, prepare agendas, document minutes, and track actions.
1.1.3	Program Review Support	Element Integration for ATV	Coordinate and Lead ESA-NASA Trilateral and
1.1.3	Program Review Support	Element Integration for ATV	Prepare and lead monthly meeting/tag-up with system engineers to review requirement status: open, missing docs, stage testing, RIDs, etc

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.1.1.3	Program Review Support	Element Integration for ATV	Coordinate tag-ups with local ESA liaison to synchronize bilateral matrix. Tag-up with ESA
1.1.3	Program Review Support	Element Integration for ATV	counterpart in Europe to sync up trilateral matrix  Prepare statistics and charts for monthly OB tag-up, monthly LPMT and monthly/quarterly PMR
.1.1.3	Program Review Support	Element Integration for OGS,WRS, UPA	Maintain matrix showing requirements ownership for OGS, WRS, UPA. maintain VCNs.Distribute documents for review and track comments.  Organize issue resolution meeting, documenent Closure, and track actions. load VCNs to JSC server
.1.1.3	Program Review Support	Element Integration for Columbus	Track open work for the Columbus Element. Coordinate requirements closures, dependencies, RID closures, action item, and data distribution with ESA and NASA. Develop the Columbus ESA/NASA VCB and team meeting agendas and coordinate them with NASA and ESA. Upload documents into EDMS. Status open items at the EMCR. Maintain the Columbus Burn Down List, VCM, and Minutes, Team list, Distribution lists and other integration support products.
.1.1.4	Coordinate Office CR Evaluations	Review new OB CR's	check for proper format, grammar, spelling, complete information, acronyms not spelled out, make corrections and if necessary, transfer information to current forms.
.1.1.5	Coordinate Office CR Evaluations	CR Distribution	Prepare e-mails for CR evaluation - determine those needing to review the documents, pull CR and all support documents from EMDS to include in the e-mail, prepare folders in outlook to maintain control of files, submitting 2nd & 3rd requests for eval.
.1.1.6	Coordinate Office CR Evaluations	CR closure	Prepare consolidated evaluation forms for signature. Once signed submit e-mail notification of closure w/evaluation to appropriate CM receipt desk and the CI
.1.1.6	Office Web Content	Web Development & Maintenance	Create and maintain web pages for OB, OB2, OB3, and OB5. Create and maintain MER web pages and maintain files on the MER server.
.1.1.6	Office Web Content	Webpages	T&V webpage with weekly updates to KSC Upcoming mtg and pic-of-the-week, ATV RID updates, OB3 webpage, import/export log webpage, back-up to OB curator.
.1.1,6	Office Web Content	Import/Export Webpage	Update OB export log with inputs from engineers when they export Ensure up-to-date log is avaliable on OB export website Link EST# in the log to the JSC EST database
.1.1.6	Office Web Content	OB6 Web curator	Upload CoFR Data, LPA-SORR, FRR, production plans, CoFR plans, action tracing, individual assigned tasks. JCCT data, Common Spec, Export data, open risk
1.1.7	Coordinate Office CR Evaluations	Matrix - CR evaluations	Maintain CR evaluation matrix with CR, Deviations, Waivers, and Shuttle CR's - listing all evaluators for each request and maintain response status, noting Late responders, complete an end of month status for evaluation process

.1.1.8	Coordinate Office CR Evaluations	Miscellaneous Tasks for CRs	EDMS as requested, checking status on CR's for Action items or closure path, assist w/working
.1.2.1	Issue Resolution	PRACA and NCR resolution	through questions which arise from evaluations Provide Problem Reporting and Corrective Action (PRACA) closure, Problem Report (PR) closure, and NCR closure rational for Node 2 and 3.
.1.2.1	Issue Resolution	Test and Verification Engineer	Supported MVCB meetings as T&V representative.
1.2.1	Issue Resolution	PIRNs for Node 2/3	Receive PIRNs from Node 2/3 book managers to acquire Rafael Garcia's signature after first confirming that the ESA Engineering Board (EB) and the Change Control Board (CCB) at MSFC have concurred. Fax to book managers under Chau Hong (OM).  Support the CCB meeting for realtime updates, location of presenters and signature needs.
.1.2.1	Issue Resolution	Systems Integration for CHeCS CMS	Help coordinate system/project issues going to Program boards/panels (eg, VCB, T&VCP, SWG, ASCB) to ensure products coming forward meet Program's expectation, dissenting/supporting positions have been coordinated and supporting/affected organizational impacts have been coordinated.
.1.2.1	Issue Resolution	OB Represenation at Program-level Reviews, Boards and Meetings	OB Board Member for CHeCS CMS Project Milestone Reviews (eg, SRR, SDR, SAR). OB represenative to CHeCS CMS Technical Interchange Meetings (TIMs) with International Partners. OB representative for Increment 16 IMT & JOP (Primary), Flight 17A IMT & JOP (Primary), ASCB (Backup), R&M Panel (Backup)
1.2.2	Engineering Evaluation and Integration	Addition	Provide ISS engineering support with concentration on the Internal Active Thermal Control System (IATCS). Work involves all program disciplines such as systems engineering, requirements development, design, hardware integration, testing and verification. Activities include direct involvement and coordination with NASA design boards, ISS International Partners and various commercial vendors to ensure design specifications and scheduled milestones are met and are within budgetary constraints as required. Currently providing support for three ISS projects: Node 2, Node 3 and the IATCS Special Problem and Resolution Team (SPRT). Node 2 duties include Problem Reporting and Corrective Action (PRACA) closure, Problem Report (PR) closure, design changes, close-out activities and Flight 10A mission support. Node 3 duties involve test and verification, Non-Conformance Reporting (NCR) and design review/change support. IATCS SPRT involvement includes engineering support for both ISS on-orbit operation and future inc

.1.2.2	Engineering	Test and Verification	Review proposed testing for all ICC !
	Evaluation and Integration	Engineer	Review proposed testing for all ISS hardware as it pertains to SSP 41172 Qualification and Acceptance Environmental Test Requirements.
.1.2.2	Engineering Evaluation and Integration	Test and Verification Engineer	Review test anomalies of hardware and recommend necessary workmanship retest via and RVA "Reverification Assessment" and/or RIA "Requirement Interpretation Agreement".
.1.2.2	Engineering Evaluation and Integration	Test and Verification Engineer	Provide integration and engineering support to the CMC FSE effort by reviewing FSE T&V requirements and communicating with S&M to insure that proposed testing is adequate for reference hardware.
.1.2.2	Engineering Evaluation and Integration	T&V Process	T&V database adminstrator to track RIAs, RVAs, TIAs, TCVs, and Export report to Boeing for OPMT.
.1.2.2	Engineering Evaluation and Integration	ATV verification management	Provide technical assistance and coordination for anomaly resolution with NASA engineers and ESA representatives. Perform technical assessments and reviews of Document Change Notice (DCNs), Request for Waiver (RFWs) and Proposed Interface Revision Notice (PIRNs) for potential impacts to NASA requirements as well as system safety, and provide appropriate input to applicable authors and engineers. Trace requirements between multiple sources ensuring proper closure. Maintain RID matrix for NASA Management. Prepare technical briefings.
.1.2.2	Engineering Evaluation and Integration	HTV verification management	Provide technical assistance and coordination with NASA engineering for requirement verification. Perform technical assessments and reviews of technical documentation (e.g., Interface Control Document( particularily in relationship to the System Specifications of the International Space Station. Update documentation to ensure accurracy and compliance with ISS requirements. Maintain
1.2.2	Engineering Evaluation and Integration	CEV verification management	requirements matrix for NASA management  Perform technical review of proposed Interface control documentation between the ISS and CEV.  Verify requirements of the ISS have been adequately addrssed in the new documentation.  Represent OB3 at technical reviews and NASA management reviews for the CEV program
1.2.2	Engineering Evaluation and Integration	COTS Verification Management	Provide technical review, corrections and inputs to the Interface Control Documentation for both COTS vehicles. Rewrite technical documents ensuring accurracy and completeness. Provide an independent review of documentation prior to release.
1.2.2	Engineering Evaluation and Integration	Pressure & Leak Testing	Develop reliable leak test methods to be placed into SSP 41172, Qualification and Acceptance Environmental Test Requirements. Review every document that the ISSP has a word "leak" in it, i.e., drawing & specifications requirements, test procedures & reports, OMRSD, CRs, etc., to make sure they are compliant with SSP 41172. Participate

			in the hardware and Element leak testing.
.1.2.2	Engineering Evaluation and Integration	Cupola Element management	Manage remaining development of the Cupola Element (for integration with Node 3) and associate remaining open paper closure
.1.2.2	Engineering Evaluation and Integration	CAM Project Closeout	Manage remaining development of the CAM Element (for integration with Node 3) and associate
1.2.2	Engineering Evaluation and Integration	CR Review	Review and evaluate CR's and prepare input to OB response to determine whether the CR should be
1.2.2	Engineering Evaluation and Integration	Systems Integration for CHeCS CMS	approved and implemented as proposed.  Review Program-level CRs to identify impacts to areas of responsibility (eg, CHeCS CMS, INC 16, Flight 17A).
.1.2.3	Integrated Test and Verification (IT&V) Support	Test and Verification of Commercial Orbital Transportation Services (COTS) Visiting Vehicle Integration to ISS	Joint analysis and test schedule integration. Data Exchange Requirements and Integration and Verification Plan drafting support.
1.2.3	Integrated Test and Verification (IT&V) Support	OMRS Process	Develop and maintain OMRS RCN's for JSC and support other center RCN's. Formal approval is done once concurrence has been received for the community and formal approval given after presenting to the TSY/CR
1.2.3	Integrated Test and Verification (IT&V) Support	Risk Management	presenting to the T&VCP.  Assist OB Risk Management Manager and provide support for IRMA input and update, PRAB and other support activities as required.
1.2.3	Integrated Test and Verification (IT&V) Support	Russian Segment (RS) Integration & Verification	Verify specs and ICD (SSP 41163, SSP 50227, etc.) requirements applicable to the RS. Review and approve VCMs for Russian modules and vehicles. Develop Test & Verification plans and Section 4 requirements for new Russian modules, i.e., MLM, DCM, and/or RS reconfiguration, for example, DC1 relocation. To be a book manager for NASA-RSA Phase 2-3 Bilateral Integration and Verification Plan, SSP 50101, i.e., issue NDCs and revise the book as needed.
.2.3	Integrated Test and Verification (IT&V) Support	Element Integration for Node 3	Maintain matrix showing requirements for Node 3 which need to be developed. Develop and maintain OMRS for Node 3. Organize meetings with system representatives to finalize OMRS. Coordinate tests dates and need dates for OMRS with KSC. Present the status of Node 3 OMRS and Node 3 TAS as result of Node 3 Descope activities to SIT and MVCB.
2.3	Integrated Test and Verification (IT&V) Support	RCN Development and Maintenance for Node 2	Enter data in OMRSD for all Node 2 RCNs. Lead the coordination of parties that need to review and concur with the requirements. Make sure the requirements are done in accordance with OMRSD

			guidelines.
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.1.2.3	Integrated Test and Verification (IT&V) Support	T&V development and sustaining for COTS vehicles	Work with NASA subsystem and COTS personnel from SpaceX and RpK to develop test and verification program for COTS vehicles and to provide oversight and internal coordination of COT developed verification products with NASA personnel in the execution of the COTS test and verification program.
1.2.3	Integrated Test and Verification (IT&V) Support	T&V development and sustaining for the Orion vehicle	Work with NASA subsystem and Orion project personnel to develop test and verification program for the Orion vehicle interfaces to the ISS and to provide oversight and internal coordination of the Orion project developed verification products with NASA personnel in the execution of the Orion vehicle test and verification program.
1.2.4	Cable and Fluid Assessment	Cable & Fluid Interface Assessment and Digital Pre assembly	Work out all the issues associated with the DVOs for Cable & Fluid Interface Assessment, i.e., Perform As-Designed & Physical Audits for and Demonstrate Mating of Electrical/Avionics & Fluid Interfaces, and also Demonstrate On-Orbit Constraints Allow Mating of IVA & EVA Interfaces. Participate in testing. Review and approve Reports and VCNs prepared by Boeing that is contractually obligated to this assessment.  Work out all the issues associated with the Digital Pre-Assembly, i.e., review plans, procedures
.2.5	Project Management Support	ISS Visiting Integration & Integrated Carriers Group	reports, BIVP test sheets, etc.  Compile WAR inputs for the ISS Visiting Integration & Integrated Carriers Group and submit to the quarterly WAR integrator
.2.5	Project Management Support	Non-Prime Earned Value	Collect, report, and submit the Earned Value metrics for OB's non-prime contract work. Each month, provide feedback to the points of contact. They, in turn, provide the earned value for their area and that is updarted to the earned value metric (file). The results are briefed to Sharon Conover and/or Dan.
2.5	Project Management Support	OB STaR	Coordinating OB's portion of STaR. This involves crossover tasks with the liens and threats list IMPR
2.5	Project Management Support	Capability Upgrades schedule	and the newly established STaR VCB.  Take inputs from and update the Primavera
2.5	Project Management Support	ОВ РМР	schedule for Capability Upgrades.  Propose methods for tracking the on-going work within OB6. This task involves working with the leads within OB6 and collecting their inputs. Further research is being done on the
2.5	Project Management Support	OB6 Action Tracking	research is being done on the use of groupware.  Sharon wants a way to track the on-going work within OB6. This task involves working with the leads within OB6 and collection their in the leads within OB6.
2.5	Project Management Support	OB IMPR	leads within OB6 and collecting their inputs for Establish a schedule for updating OB's IMPR data - monthly. Once done, update the binder Dan references during the IMPR. Run the preview briefing to Dan / Linda.

1.2.5	Project Management	OB liens & threats	Te-stable to the state of the s
	Support	Specific & fillests	Establish, collect, and update the OB liens and threats list (an Excel spreadsheet). Coordinate the elements with other risk holders that provide inputs to IRMA (used at the PRAB). Brief Dan / Linda bi-
.1.2.5	Pasiant Manager		weekly on the liens and threats list status
. 1 . 4 . 7	Project Management Support	OB6 WAR consolidator	Compile OB6 WARs, generate two task/accomplishment list, submit 1. to L. Uljon. 1. to S.Conover with a cc: to B.Lasater
.1.2.5	Project Management Support	OB3 System Integrator new project initiation	Generate/track Change request for new project. Respond/track evaluations. Prepare schedule and cost impacts. Present to program boards.
.1.2.5	Project Management Support	OB3 System Integrator Sustaining Engineering	Generate/track Change Request for design changes to existing projects. Provide schedule/Budget tracking. Provide Review support from program to
.1.2.5	Project Management Support	OB3 System Integrator System/Program support	project and Board support from project to program.  Support IRMA tracking and updates. Prioritize Program tasks to system. Provide hardware expertise to Program/Project. Support Working Group/SPRT meetings
.1.2.5	Project Management Support	OB4 Project Integrator, New Projects	Generate/track Change request for new project. Respond/track evaluations. Prepare schedule and
.1.2.5	Project Management Support	OB4 Project Integrator, Project Support	cost impacts. Present to program boards.  Generate/track Change Request for requirement changes to existing projects. Provide schedule/Budget/technical risk tracking. Provide Review support from program to project and Board
.1.2.5	Project Management Support	OB4 Project Integrator, Special Studies	support from project to program.  Provide technical support for special studies including architecture changes for ISS.
.1.2.5	Project Management Support	Nodes Project Representative	Attend Nodes related meetings as the Project Representative. Discuss the information directly
.1.2.5	Project Management Support	Node 2 COFR	related to Nodes with Nodes Project Manager.  Assist with Open Paper for Node 2.
.1.2.5	Project Management Support	Regen ECLSS Support	Provide support to OB4 when requested to manifest Regen ECLSS hardware and coordinate hardware shipments to appropriate locations for bench review and support bench review activities.
.1.2.5	Project Management Support	Miscellaneous Tasks	These include working export control documents: 1724s, 290s, 1735s for WHC project (now compketed). Obtain data from hardware providers; complete forms, route for signature.
1.2.5	Project Management Support	ATCS SI Backup	Provide backup support to the ATCS System Integrator (SI); OB3 QDIRT rep; notify appropriate SI of issues that may impact upcoming flights (cost, schedule, etc); attend weekly ATCS tag up meetings.
1.2.5	Project Management Support	Expedition 17 Increment	Serve as OB delegate to the INC 17 Team; Maintain cognizance of all issues affecting OB owned systems and coordinate solutions with the appropriate team as required; attend IMT and INC 17 Team status meetings as scheduled

.1.2.5	Project Management Support	MPLM Support	Serve as OB3 delegate to the MPLM teams at MSFC and KSC; maintain cognizance of MPLM issues, status of PR's being processed and
·			proposed hardware modifications.
.1.2.5	Project Management Support	Fire Port Labels	Coordinate processing of label request for manufacture and installation in U.S. pressurized elements; assist IP element managers as needed it getting their requests processed in accordance with
			standard format and nomenclature.
.1.2.5	Project Management Support	FSE SUPPORT	Support OB inputs to the design, manufacture, testing, and acceptance of new FSE hardware. Support OB FSE sustaining engineering functions after the FSE item has flown one time. Attend FSE coordination meetings to support OB positions and
1.2.5	Project Management Support	Systems Integration for CHeCS CMS	and cost by participating in monthly TCSR reviews. Support fiscal year ITA & Work Package definition. Document and manage system-level Risks, Liens, and Threats.  Maintain knowledge of system/project status, issues and resolution efforts via participation in weekly SPRT meetings. Support requirements definition for new hardware development projects and maintain current CHeCS Spec requirements. Support definition, development and implementation
.2.5	Project Management Support	Systems Integration for CHeCS CMS	of the CMS Strategic and Implementation Plans.  Communicate system/project conflicts and priorities up to the Program and Program priorities down to
.2.5	Project Management Support	Processes and Procedures Development	the system/project.  Support definition, documentation and improvement of OB/OB3 processes and procedures. Support definition, documentation and improvement of CHeCS-related processes and procedures. OB3
.2.7	Book Coordination Support	Management of Crew Health Care System (CHeCS) Specification, and T2 Specification	Liason to OB6 for process support.  Manage existing requirements and work change requests that impact those requirements. Work with system integrators and their teams to draft requirements for new hardware.
2.7	Book Coordination Support	Book Management	Coordinate and update input from OB for the OB SPIP (Space Station Implementation Plan). Make sure that updates are made in accordance with DQA, correct signatures are obtained and submit the book to EDMS.
	Vehicle Management and Administration		1. Scope/Description: Under contract SOW 1.3.1 ISSP Engineering and Technical Services, the subcontractor shall assist in performing the following tasks:  a. Perform strategic assessments of ISS Vehicle performance and functionality given varying input assumptions, i.e. Assembly Sequence, number of Shuttle flights, pre-positioning achieved, post-Shuttle

	b. Perform assessments to determine the sensitivity of current maintenance strategies to the potential programmatic variables.  c. Identify vehicle/system performance risks & recommended strategies to mitigate risks. Includes 1-pager concept as a tool to display and communicate the myriad of pertinent program parameters as a function of time.  d. Perform vehicle/system performance risk versus cost assessments.  e. Perform trade studies as required to support strategic maintenance planning.  f. Analyze spares requirements for the Shuttle retirement and recommend the quantities of ORUs for each subsystem to support Station through 2015 and other potential end dates.  g. Provide a rolling cost estimate for the spare procurements as an on-going input to the budget process.
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